

CLAIMS

1. Individual cell for a fuel cell comprising a first and a second electrode layers enabling gas transfer and respectively having a first and a second porosities, a solid electrolyte layer located between the two electrode layers, the two electrode layers consisting of an anode and a cathode, the first electrode layer comprising at least a first compact zone with a third porosity, the third porosity being lower than the first porosity, characterised wherein a first compact zone is a protuberance of the electrolyte layer and/or is composed of the densified material from which the electrode including the said zone is made.

2. Individual cell for a fuel cell according to claim 1 wherein the first electrode layer has a first thickness and a first compact zone has a thickness identical to the first thickness.

3. Individual cell for a fuel cell according to claim 1 wherein the second electrode layer comprises at least a second compact zone with a fourth porosity, the fourth porosity being lower than the second porosity.

4. Individual cell for a fuel cell according to claim 3 wherein the second electrode layer has a second thickness, and a second compact zone has a thickness identical to the second thickness.

5. Individual cell for a fuel cell according to claim 4 wherein the first electrode layer has a first thickness, and a first compact zone has a thickness identical to the first thickness.

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6. Individual cell for a fuel cell according to claim 3 wherein a second compact zone is a protuberance of the electrolyte layer and/or is composed of the densified material from which the electrode including said zone is made.

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7. Individual cell for a fuel cell according to claim 1 also comprising at least one bipolar plate adjacent to an electrode layer.

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8. Individual cell for a fuel cell according to claim 7 comprising two bipolar plates adjacent to each electrode layer.

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9. Individual cell for a fuel cell according to claim 7 wherein the bipolar plate has a coefficient of thermal expansion higher than the coefficient of thermal expansion of the adjacent electrode layer and the electrolyte layer.

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10. Individual cell for a fuel cell according to claim 9 wherein the bipolar plate (20) is connected to the adjacent electrode layer by nesting.

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11. Individual cell for a fuel cell according to claim 10 wherein the bipolar plate

comprises at least a protuberance and the adjacent layer comprises a cavity, said protuberance of the bipolar plate and the cavity fitting one into the other.

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12. Individual cell for a fuel cell according to claim 11 wherein the cavity is located in a compact zone (11) of the electrode layer.

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13. Individual cell for a fuel cell according to claim 12 wherein the cavity is located in a protuberance of the electrolyte layer.

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14. Individual cell for a fuel cell according to claim 11 wherein the cavity is larger in width and/or in depth than the width and/or height of the protuberance of the bipolar plate.

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15. Individual cell for a fuel cell according to claim 11 comprising a plurality of cavities.

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16. Individual cell for a fuel cell according to claim 1 also comprising at least a first gas inlet on the cathode such that the entire area of the anode adjacent to each first gas inlet is a compact area of the anode and/or at least a second gas inlet on the anode such that the entire area of the cathode adjacent to each second gas inlet is a compact area of the cathode.

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17. Fuel cell comprising a stack of cells according to claim 16, each cell being separated from its neighbour by a bipolar plate.

5 18. Fuel cell according to claim 17 with a circular plane geometry.

10 19. Individual cell for a fuel cell comprising an anode layer, a cathode layer, a solid electrolyte layer located between the anode layer and the cathode layer, a bipolar plate adjacent to each of the anode and cathode layer, each of the anode and cathode layer comprising a dense zone having a thickness equal to the thickness of the corresponding
15 anode and cathode layer, the porosity of the dense zone being larger than the porosity of the corresponding anode and cathode layer, the dense zone comprising a cavity wherein a corresponding protuberance of the adjacent bipolar plate can fit.

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20. Individual cell according to claim 19 comprising gas inlets for one of the anode and cathode located in dense zones of the other anode and cathode.